



Laboratory Equipment Manufacturer
www.mrclab.com



Operation Manual for Tensile Testing Machine **B1/E TYPE**



PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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■Attention

Read and understand the following safety precautions in order to eliminate the risk of damages on machinery and physical damage to the operators and other people during the operation. The following symbols are used to indicate the degrees of hazard seriousness possibly occurred when you fail to comply with the safety precautions :

	DAMGER: Indicates a potentially hazardous situation, which if not avoided, will result in death or serious damage.
	ATTENTION: Indicates a potentially hazardous situation, which if not avoided, will result in minor injury or property damage.

The following symbols indicate what you must do or must not do

	Indicates that the operation is prohibited to do
	Indicates that the operation must be done.















DANGER

	Do not subject the product to water, corrosive or flammable gases, and combustibles. The failure could result in fire.		Ground the earthterminal of the motor and driver without fail.
--	---	--	--



CAUTION

	Do not give strong impact shock to the driver and the motor. Failure to observe this instruction could result in damages.		Do not block the heat dissipating holes or put the foreign particles into them.
--	--	--	---

 <p>Do not turn on or off the main power repeatedly. Failure to observe this instruction could result in breakdowns.</p>	 <p>Do not stand on the product nor place the heavy object on them Failure to observe this instruction could result in electric shocks, injuries, damages, or malfunction.</p>
 <p>Avoid excessive gain adjustments, changes, or unstable operation of the product. The failure could result in injuries.</p>	 <p>Do not approach to the equipment after recovery from the power failure because they may restart suddenly. Execute the personal safety setting on the equipment after the restart.</p>
 <p>Do not modify, dismantle nor repair the product. Failure to observe this instruction could result in electric shocks, injuries or fire.</p>	 <p>If an error occurs, remove the causes of the error and secure the safety before restarting the operation.</p>
 <p>Use the eye-bolt of the motor only when you move the machine. Failure to observe this instruction could result in injuries, or damages.</p>	 <p>Conduct proper installation according to product weight or rated output. The failure could result in injuries, or damages.</p>
 <p>Ambient temperature of installed motor and driver should be under permissible one. The failure could result in damages.</p>	 <p>Make sure that the wirings are correctly connected. The failure could result in electric shocks, or injuries.</p>
 <p>Install the driver and the motor in the specified direction. The failure could result in damages.</p>	 <p>Use the specified voltage on the product. The failure could result in electric shocks, injuries, or fire.</p>



This sign remind users would have dangerous for head.



Do not touch the rotating portion of the motor while it is running..



This sign remind users would have dangerous for hand.



This sign remind user that here is transporting fulcrum.

■ Maintenance/Examination

Please maintain the machine on a regular time schedule.

Notice for maintain and examination

- (1) Turn on and turn off the power should be done by professional staff.
- (2) After turning off power, use high –voltage to charge inside circuit temporarily. Before examination, cut off the power first, and wait until the LCD panel totally close (about 15 minutes) then start examination.
- (3) When use insulating resistance measurement of the driver, please pull out all wiring of the driver first. When connect with wiring state, it is likely to cause damages to the driver.

Examination items and period

Environmental condition: Annual average temperature is 30 degrees; load rate is under 80%, average working hour: under 5 hours every day

※Please accord with the following list, inspect at ordinary times and regularly.

Name	Period	Check item
Daily	Daily	<ul style="list-style-type: none"> ➤ Confirm temperature, humidity, dust, dust, foreign matter, etc. ➤ Unusually shake, unusual sound ➤ Whether the voltage of the power is normal ➤ Whether has rare delicacy ➤ Whether wastepaper are in every air outlet ➤ Whether it is damaged to mix the line ➤ Whether has release situation with tensile machine. ➤ Whether has garbage in crossbar ➤ The clean condition of adaptor
Periodical	Annually	<ul style="list-style-type: none"> ➤ Whether the loosed situation on fixed tight ➤ Whether High-temperature sign ➤ Whether the tension of the drive belt is normal ➤ Whether the slide bar is lubricating

[Attention] If user finds error according to the above items while regularly checking, please change examination period.

■ Replacing spare parts

According to the environmental condition, has different operation method. When happened unusually, must change immediately (repair) Part.



Forbid disassembling the machine body should be acried out by authorized dealers.

product name	Differentiation	The standard changed time	remark
Driver	Capacitor	About 5 years	The lifetime is only for reference. If unusual situation happened, please replace new components immediately
	Cooling fan	2-3 years (ten thousands ~ thirty thousands hours)	
	Aluminum electrolytic capacitor	About 5 years	
	Relay	About 100,000 times (depend on actual usage condition)	
Motor	Bearing	3-5 year (twenty thousand~ thirty thousand hours)	
	Oil seal	5000 hours	
B4 controller	B4 controller	About 3-5 years	
Transmission	Ball Screw	About 10 years	
	Belt transmission	About 10 years	

■Preface

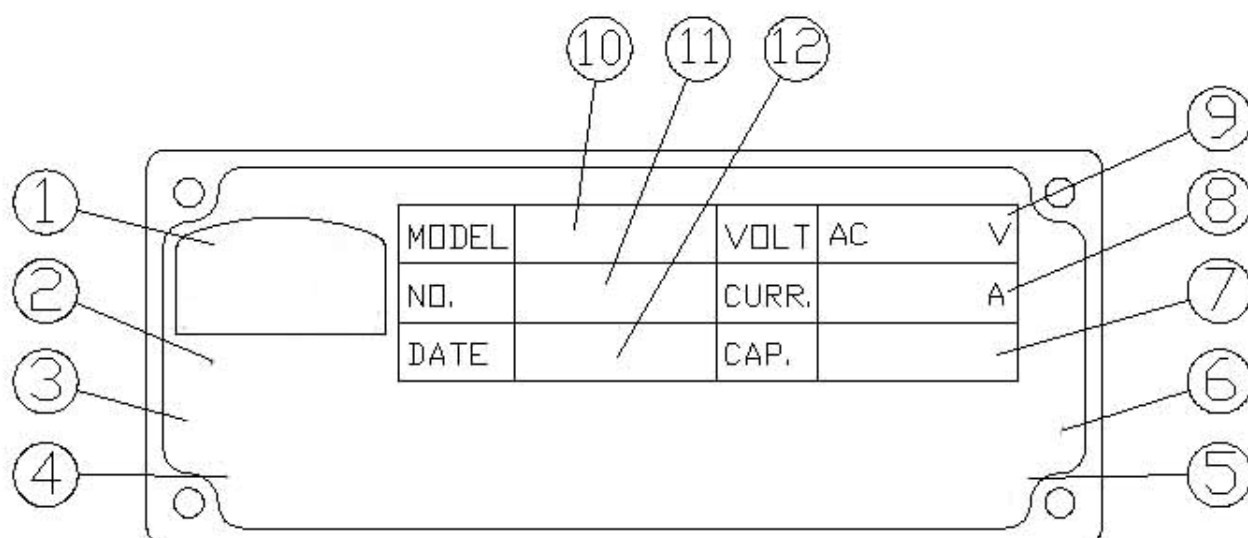
Material Testing Machines could present danger due to the high forces and energies involved in the repetitive motions. Operator should be very careful when using or moving related equipment especially electronic parts and crosshead of testing system. The operator should be knowledgeable about the operation and function of the equipment prior to use. It could present a dangerous situation because of unexpected action from the crosshead when being used improperly.

Carefully read and understand the related information and understand all “warning”, “attention”, “caution”, they are reminders for most issues that could cause damage to the machine or cause data loss. Make sure the testing equipment and procedures are set up to ‘Testing is conformed to specimen material’ and all parts and structures are safe to the operator. Fully use the limit devices, they are designed to ensure operator safety and prevent the cross-head from improper travel. The best precaution is to fully understand the machine and for the operator to be alert while operating the equipment.

Basic Concepts of the machine are listed below:

1. It is very important to set proper distance between up/down limit to bring into complete protection.
2. When emergency button has been pushed, this tester keeps the status of no electricity. Release this button to restore power source.
3. Read this introduction before connecting each wire of this machine.
4. It could cause danger with wrong specimen, parts, or structure. Please use protecting shield; the machine owner and operator should take all responsibility if injuries are caused from material characters.
5. Install or re-move specimen, parts or accessories, it should be done out of causing any damage on the grips.
6. Clean gripping face, when it’s not using.
7. Please stop the cross head when exchange grips. If it’s necessary to move cross head, please use the lowest speed.
8. All parts modify, replace by un-authorized party shall not under Warranty.
9. We reserve all right to modify this tester, conflict occurred between this instruction and true object, subject to machine itself.

■Name plate



- 1.Brand of our company
2. Name of our company
3. Our company telephone number
4. Our company fax number
5. Web side of our company
6. Email address of our company
7. The max capacity of this machine
8. Specified electric current
9. Specified voltage of the testing machine
10. The model number of machine
11. Serial number of the testing machine
12. Date of production of testing machine

Chapter 1 Transportation

If this machine is dispatched by wooden package, please take apart it carefully
When you move this machine, please be careful and forbid turn upside down.



Testing machine is not package by standard wooden case.

Before you taking apart the wooden case, please remove the up cover first to ensure each component at its position. Than take apart front board and fixed layer careful.



Please don't hit by actuated things.

When you have to move machine, please proceed by following two methods:

1. Use crane carry: there has crane on the top of machine. Please hand on crane and carry.



If there has two cranes, forbid hand on one crane.

2. Use lift carry: machine has carry fulcrum, please as it be lift's point of application of force.



The point of application of force should be carry fulcrum of this machine.



Forbid any position be carry fulcrum expect indicated point

Chapter 2 Installatuion

2.1 Installation location

- (1) Install in room to avoid sun light and moisture, this machine is not water-proof.
- (2) Please don't install at the place where is full of hydrogen sulfide, sulphurous acid, chlorine, sulfide and mist etc...
- (3) Please keep air circulation well and don't set up at the place where humidity is.
- (4) Easy to do maintenance and clean.
- (5) With stable ground and no vibration

2.2 Environment requirement

Project	Condition
Environment temperature	10- 30 degrees (can't freeze)
Environmental humidity	Under 90% RH (can't dew)
Storage temperature	5- 40 degrees
Storage humidity	Under 90% RH (can't dew)
Vibration	Under 4.9m/S2 (0.5G) 10~ 60Hz
Altitude	Under 1000m

2.3 Attention

Our company does our best guarantee the quality. However, it still has problem caused by outside noise, input the power, distribution, etc. User has to consider invalid possibility, and operate in security ranges.

- < Attention >
- Prevent product strike strongly.
- Prevent products drop.

2.4 Available volatahe and amperage

	Voltage	Amperage
QC-500B1	200~240VAC (3-phase)	20
QC-501B1	200~240VAC (3-phase)	20
QC-502B1	200~240VAC (3-phase)	20
QC-503B1	200~240VAC (3-phase)	10
QC-505B1	200~240VAC (1-phase)	8
QC-506B1	200~240VAC (1-phase)	5
QC-506BA	200V~240VAC (1-phase)	5
QC-508B1	200~240VAC (1-phase)	5
QC-513B1	200~240VAC (1-phase)	5
QC-508E	100~240VAC	5

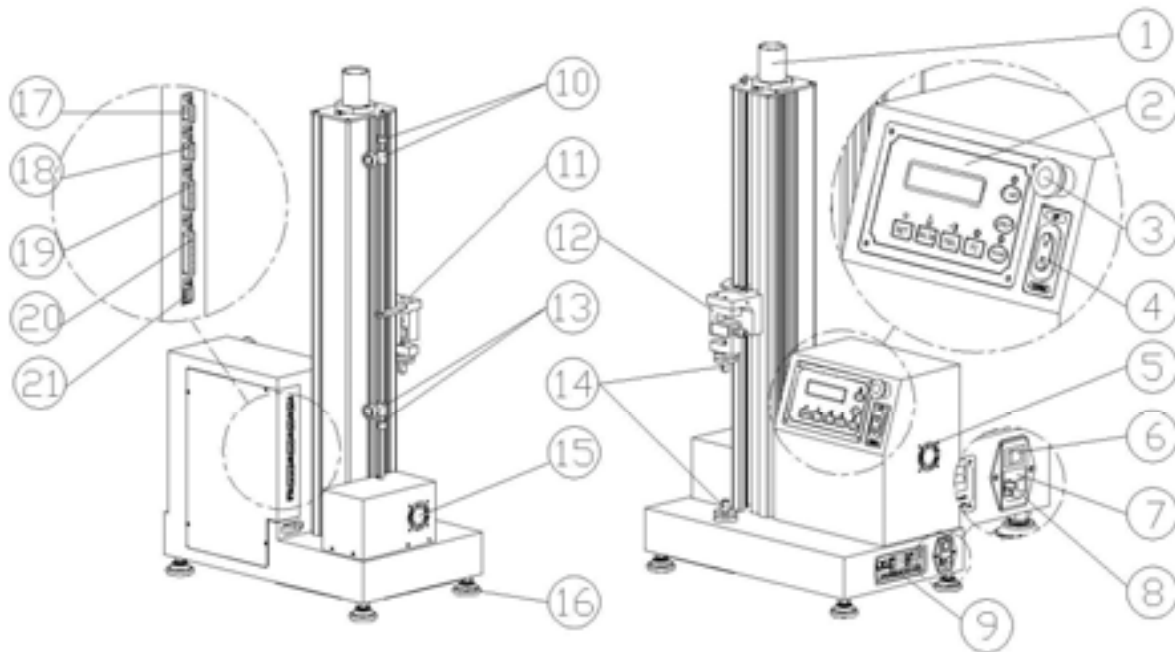
Please arrange air supply 60-80PSI(4-6kg/cm²) if you also purchase pneumatic grips or devices.

Chapter 3 Name and function of each part

B1/E series tensile testing machine has five models: QC-101B1/508E/508B1/506B1/505B1.

This hardware operation applies for all of B1/E type.

3.1 QC-508E



1. Single Extensometer

Calculate machine displacement through by collection information of screw rotation.

2. Monitor

It is for information display, output, and input so we will introduce clear in next chapter.

3. Emergency stop button

When the machine has series problem, should push emergency stop button. All of proceed of this machine will stop strong until problem removed and continue use this machine.

Please turn right side 45 degree of emergency stop button so that emergency stops button return
Then machine will work normally.

4. Manual adjusting button

The main function adjust the position of cross bar.

5. Dilator fan in controller

Eject the heat to keep the temperature in normal temperature.

6. Power switch

Switch on and off the power.

7. Fuse

The main function protects the electric system of this machine. When electric current overload, fuse will be burned. After specialist checks fuse burned reason and change new fuse to ensure machine work normal.



Forbid change the specification of fuse and it will cause series problems.

8. Input Socket

It provides power for machine. Each machine attaches dedicated power wire and must check power before connecting with power.



Forbid change the specification of power wire or it will cause series problems.

9. Name plate

The product name, the serial number and the produced date.

10. Up limit

The main function set up limitation of cross bar movement range.



Unacceptable set up proceeding will causes machine damaged.

11. Limited touch board

The main function touched limited board to make it movement.

12. Load cell

Force sensor. It should avoid any crush.

13. Down limit

The main function set down limitation of cross bar movement range.



Unacceptable set up process will causes machine damaged.

14. Fast Connector

For connecting with the grips.

15. Dilator fan in motor

Eject the heat created by motor to keep the temperature in normal temperature.

16. Adjusting foot

To suffer the machine weight, the four footplates are adjustable.

17. Load cell 1 port

Connect with load cell to transfer information to monitor.

18. Load cell 2 port

Connect with load cell to transfer information to monitor.

19. Encoder port

Connect with encoder to transfer information to monitor.

20. Printer Port

Connect with printer to make information output to printer.

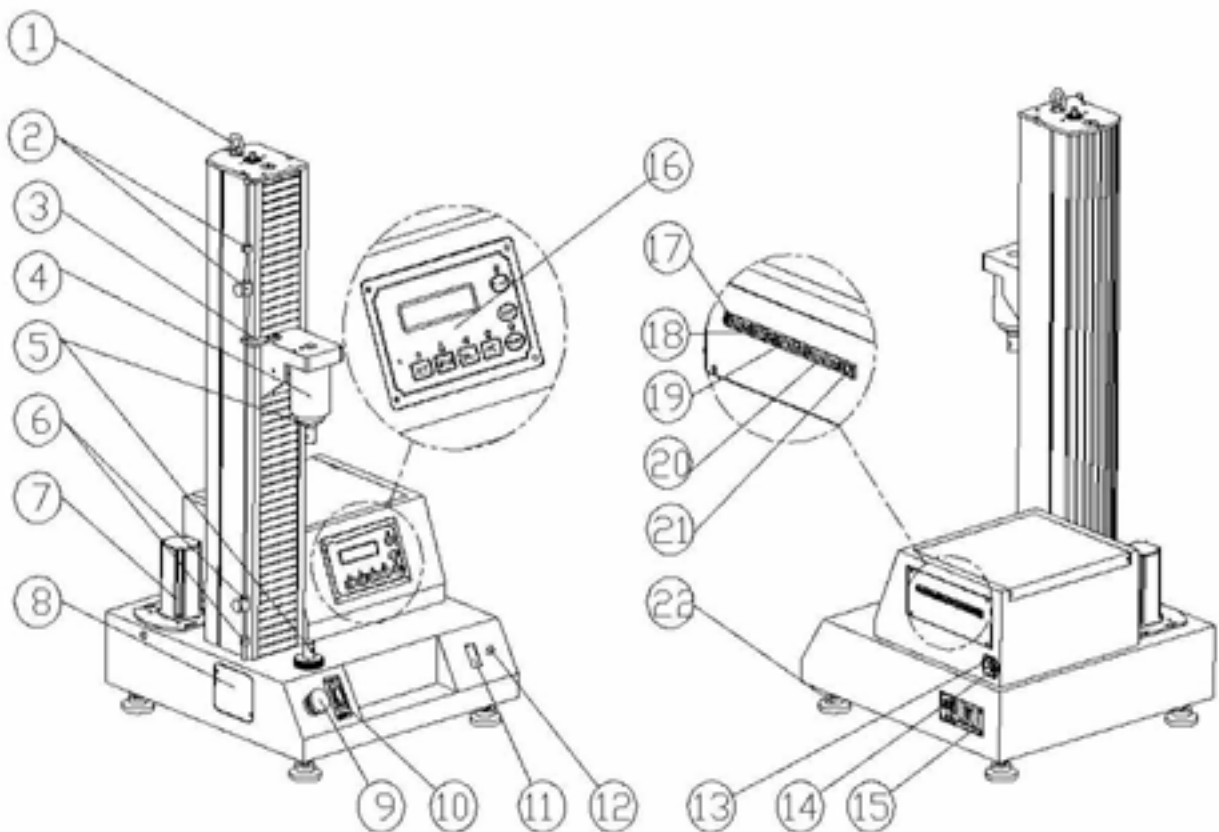
21. Communication Port

Connect with PC to make data output to PC and also control machine by PC.



This function must operate by software and you have purchase software.

3.2 QC-513B1/ 508B1



1. Eye Bolt: transport machine

2. Up limit

The main function set up limited of cross bar movement range.



Unacceptable set up proceeding will causes machine damaged.

3. Limit touch board

The main function touched limited board to make it movement.

4. Load cell

Force sensor.

5. Fast Connector

For connecting with the grips.

6. Down limit

The main function set down limited of cross bar movement range.



Unacceptable set up process will causes machine damaged.

7. Servo motor

8. Cover for protecting up /down limit

Remove cover to repair up/ down limit easily

9. Emergency stop button

When the machine has series problem, should push emergency stop button. All of proceed of this machine will stop strong until problem removed.

Please turn right side 45 degree of emergency stop button so that emergency stops button return and Machine works normally.

10. Manual adjusting button

The main function adjust the position of cross bar.

11. Power switch

Turn on and turn off the machine

12. Light indicator

To judge the machine is turned on or not.

13. Input Socket

The main function provides power for machine. Each machine attaches dedicated power wire and must check voltage before connecting with power.



Forbid change the specification of power wire and it will cause series problems.

14. Fuse

The main function protects the electric system of this machine. When electric current overload, fuse Will burn out. After specialist checks fuse burned reason and change new fuse to ensure machine work normal.



Forbid change the specification of fuse and it will cause series problems.

15. Name plate

The product name , the serial number and the produced date.

16. Monitor

It is for information display, output, input and will introduce in next chapter.

17. Load cell 1 port

Connect with load cell to transfer information to monitor.

18. Load cell 2 port

Connect with load cell to transfer information to monitor.

19 Extensometer port


Connect to extensometer

20. Printer port

Connect with printer to make information output to printer.

21. Communication Port

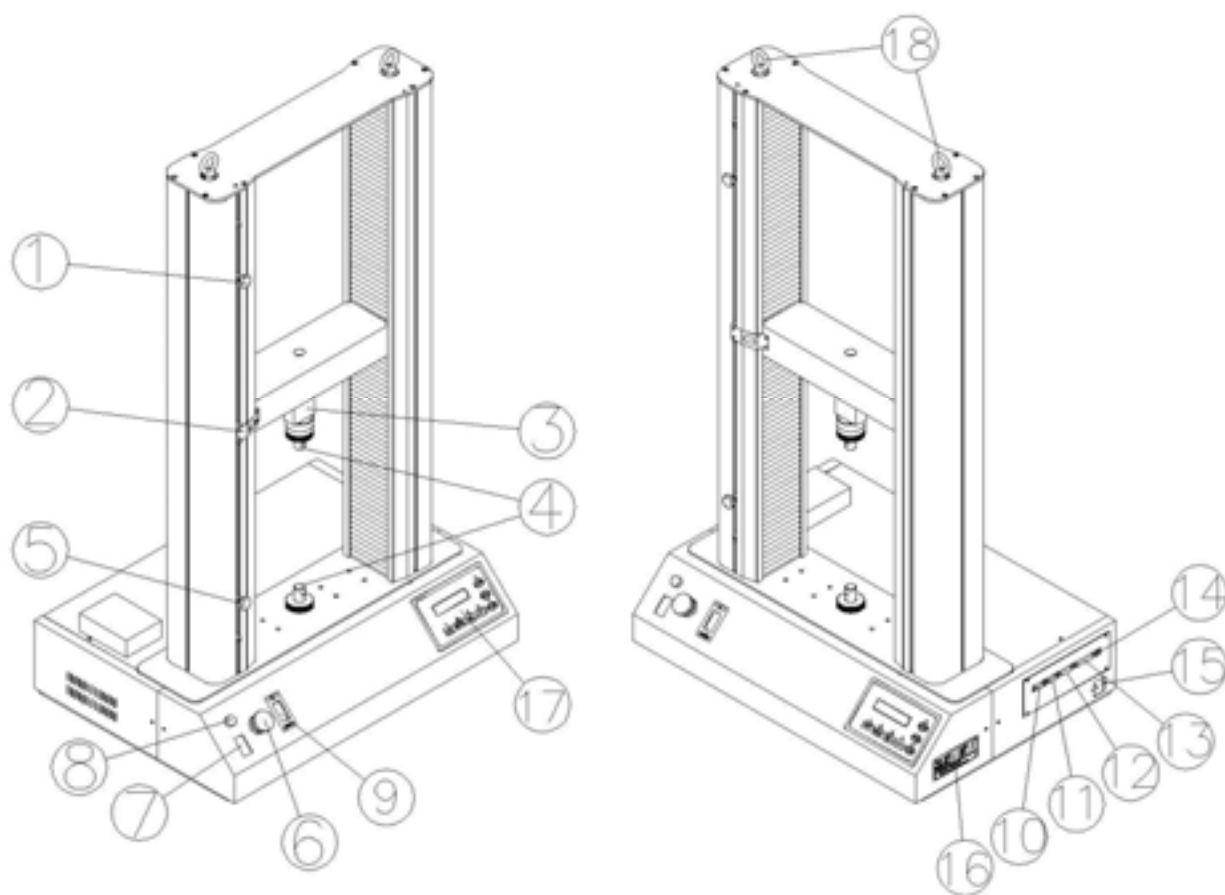
Connect with PC to make data output to PC and also control machine by PC.

 This function must operate by software and you have purchase software.

22. Footplate

To suffer the machine weight, the four footplates are adjustable.

3.3 QC-506B1



1. Up limited

The main function set up limited of cross bar movement range.

 Unacceptable set up proceeding will causes machine damaged.

2. Limited touch board

The main function touched limited board to make it movement.

3. Load cell

Connect with load cell to transfer information to monitor.

4. Fast Connector

Used to connect with the grips.

5. Down limit

The main function set down limited of cross bar movement range.



Unacceptable set up process will causes machine damaged.

6. Emergency stop button

When the machine has series problem, should push emergency stop button. All of proceed of this machine will stop strong until problem removed and continue use this machine.

Please turn right side 45 degree of emergency stop button so that emergency stops button return and machine works normally.

7. Power switch

Turn on and turn off the machine

8. Light indicator

To judge the machine is turned on or not.

9. Manual adjusting button

The main function adjust the position of cross bar.

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12 Extensometer port

Connect to extensometer

13. Printer port

Connect with printer to make information output to printer.

14. Communication Port

Connect with PC to make data output to PC and also control machine by PC.



This function must operate by software and you have purchase software.

15. Input Socket

The main function provides power for machine. Each machine attaches dedicated power wire and must check power before connecting with power.



Forbid change the specification of power wire and it will cause series problems.

16. Name plate

The product name, the serial number and the produced date.

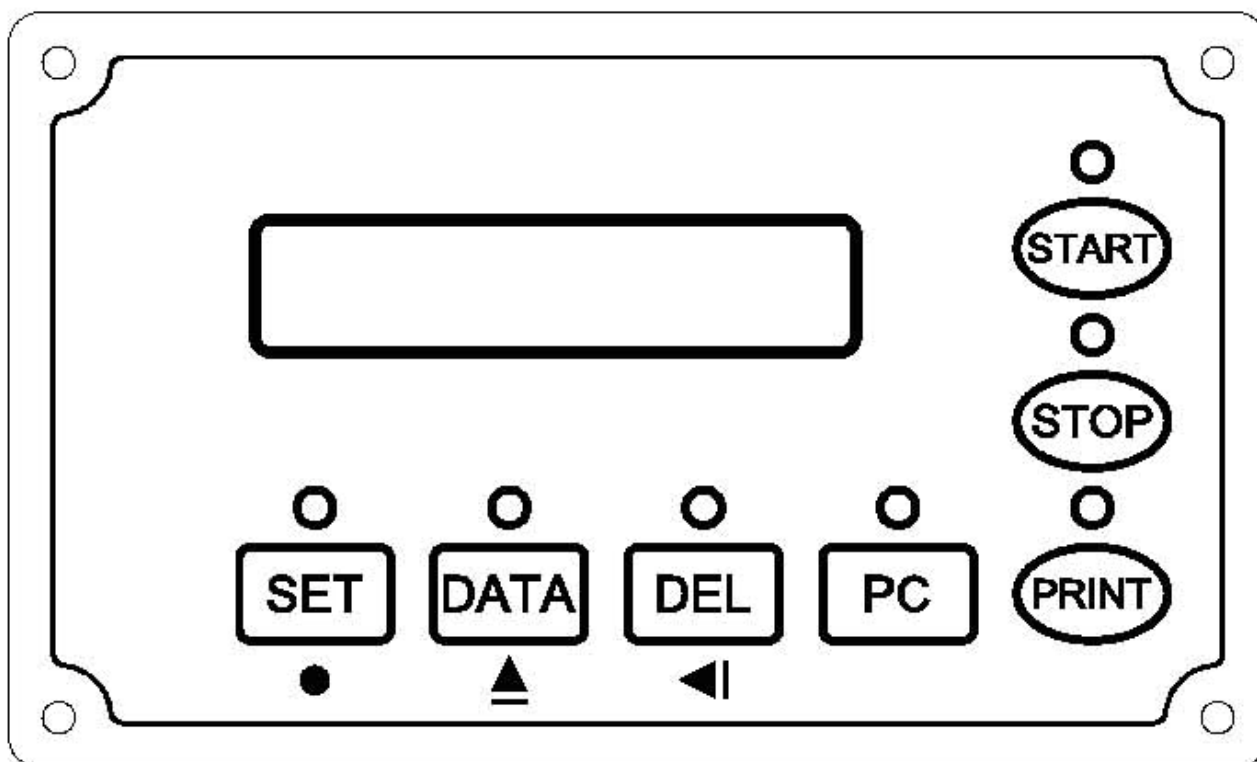
17. Monitor

It is for information display, output, and input so we will introduce clear in next chapter.

18. Eye Bolt: transportation machine

Chapter 4 Control Panel

4.1 Control Panel



Control Panel

Load: load cell suffer force at present

Ext: machine move stroke

The number of right up side: testing times or set up pages

The sign of right down side: machine condition sign.

Label	Function
	Stop situation
	Testing situation
	Manual up
	Manual down
	Crosshead up limit
	Crosshead down limit

4.2 Keypad

The operation and function is as following:

monitor keystroke	Stand by	Set up	Display result	Testing	Set up machine stop	Set up display	Set up calibration
START	Light on	Move off	Move off	No function	Move off and machine stop	Move off	Move off
STOP	Return zero	No function	No function	Stop test	No function	No function	No function
PRINT	No function	Print set up result	Print test result	No function	Print set up result	Print set up result	Print set up result
PC	Connect w/computer	No function	No function	No function	No function	No function	No function
DEL	No function	Move input point	Test result	No function	Move point	Move point	Move point
DATA	Into display result	Change input	Next data	No function	Change input	Change input	Change input
SET	into set up	Next page	No function	No function	Next page	Next page	Next page
STOP+SET	Into stop machine	No function	No function	No function	No function	No function	No function
DATA+SET	Into display result	No function	No function	No function	No function	No function	No function
PUSH DEL 3 SEC.	Into calibration	No function	Delete all test result	No function	No function	No function	No function

4.2.1

When choosing software to control machine, please press PC button, the PC light up, machine display shows “PC connect”. PC function start and users can not operate machine through machine display, only can use machine by PC. Please press START again to remove PC operating function.

4.3 Function and Set up


4.3.1 Test conditions setting

Push SET to enter into set up mode

Test type (T1)

Test Type	T1
Tensile	



Use  to switch test type. When setup finishing, push SET to save file.



Tensile:TesnileTest

Compression: compression test

Test speed (T2)

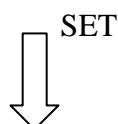
Test Speed	T2
250.00 mm/min	




Use  to move point and use  change value. When input finish, push SET to save file.

Test direction (T3)

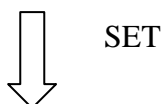
Test Direction	T3
UP	





To set up cross bar movement, use  to switch movement direction. When input finish, push SET to save file.

Gauge Length (T4)

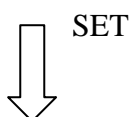
Gauge Length	T4
0060.00mm	





Use  to move bottom line, and use  to change value. When input finishing, push SET to save file.

Area (T5)

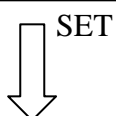
Area	T5
0010.00mm ²	




Use  to move bottom line and use  to change value. When input finishing, push SET once to save file.

Load unit(T6)

Load Unit	T6
kg	




Use  to select unit. When finishing, push SET to save file.

Length unit (T7)

Length Unit	T7
mm	



Use  to select unit. When finish, push SET key to save file.

Pre load (T8)

Pre load	T8
000.100kg	



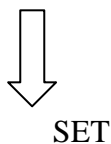
Auto returns (T9)

Auto Return	T9
Yes	



Load cell (TA)

Load Cell	TA
1 : 00100.00kg	



Extensometer (TB)

Extensometer	TB
Single	



Use to move bottom line and use to change value.

When finishing, push SET to save file.

When load is smaller than preload, the displacement will not be included.

Use to select. When finishing, push SET to save file.

Crosshead will return to start position after finishing test
Please select "No" if specimen is hard material such as steel.

Use to select applicable load cell. When completing, push SET to save file.

Use to select applicable extensometer. When finishing, push SET to save file.


If user does not use extensometer, please set TB : Single

With extensometer: select Double

Without extensometer: select Single

Save (TC)

Save The Data	TC
Yes	

Use  to switch. When finish, push SET to save file.
Machine could only memorize 50 sets testing data. Push DEL for three seconds to delete all data.

Yes: Save
No: Not save


□ Attention: if user wants to leave set up mode, push START to leave.

4.3.2 Test result setting

When stand by condition, push SET and DATA to get into test result setting mode

Peak Load (D1)

Peak Load (PL)	D1
Yes	


Use  to switch. When finishing, push SET once to save file.

Select YES and the machine will store this value in machine itself after finishing each test.



Peak Extension (D2)

Peak Extension (PE)	D2
Yes	

Use  to switch. When finishing, push SET to save file.


Select YES and the machine will store this value in machine itself after finishing each test.



Peak strength (D3)

Peak Strength (PS)	D3
Yes	



Use  to switch. When finishing, push SET to save file.


Select YES and the machine will store this value in machine itself after finishing each test.

Peak strength=Peak force/Cross-section area

Peak Elongation (D4)

Peak Elongation (P %)	D4
Yes	



Use  to switch. When finishing, push SET to save file.


Select YES and the machine will store this value in machine itself after finishing each test.

P%= extension length / original length

Break Load (D5)

Break Load (BL)	D5
Yes	




Use  to switch. When finishing, push SET to save file.

Select YES and the machine will store this value in machine itself after finishing each test.

Break Extension (D6)

Break Extension (BE)	D6
Yes	

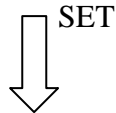



Use  to switch. When finishing, push SET to save file.

Select YES and the machine will store this value in machine itself after finishing each test.

Break Strength (D7)

Break Strength (BS)	D7
Yes	




Use  to switch. When finishing, push SET to save file.

Select YES and the machine will store this value in machine itself after finishing each test.

$$\text{Break Strength} = \text{Break load} / \text{Cross-section area}$$

Break Elongation (D8)

Break Elongation (B %)	D8
Yes	

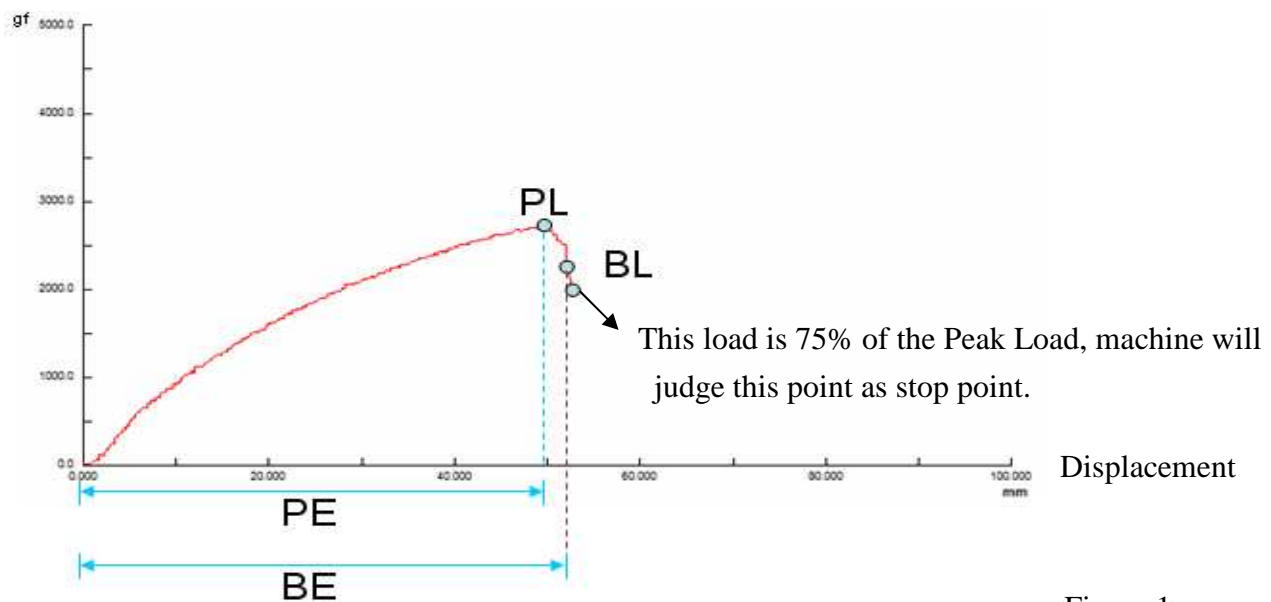
Use  to switch. When finishing, push SET to save file.

Select YES and the machine will store this value in machine itself after finishing each test.

$B\% = \text{Extension at break point} / \text{original length}$
 (Original length means the length between the two gripping position)

※Attention: If user wants to leave set up mode, push START to return.

Load



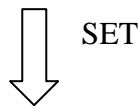
<Figure 1>

4.3.3 Machine stop setting

When machine in stand-by condition, push SET and STOP at the same time enter machine stop setting mode.

Percent Mode (S1)

Percent Mode	S1
050.00%	



Max load(S2)

Max Load	S2
40.000kg	





Max Extension(S3)

Max Extension	S3
00150.00mm	





Percent mode means when material suffer a specific load, the machine will stop automatically. Please refer <Figure 1>



Use  to move point and use  change value. When finishing, push SET to save file.

spring, metal, plastic specimen set at 50~80%
tape specimen set at 10~20%

When machine exceed max load, machine will stop.
Recommend user to set at 80% of the full capacity

Use  to move point and use  to change value. When finishing, push SET to save file.



When crosshead reaches the max extension, the machine will top

Use  to move point and use  to change value. When finishing, push SET to save file.

Max Elongation(S4)

Max Elongation	S4
00250.00%	

When crosshead reaches max elongation, the machine will stop.

Use  to move point and use  to change value. When finishing, push SET to save file.

□ Attention: if user wants to leave set-up mode, push START to return.

4.3.4 Hardware setting



※ Attention: If the parameter of hardware setting is incorrect, machine can't work normally.

Push SET before turning on the machine to get into hardware setting mode.

Load cell 1 capacity (H1)

Load Cell 1 Capacity	H1
00100.00kg	





Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Load Cell 1 Spec (H2)

Load Cell 1 Spec.	H2
02.00mv/v	





Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Load cell 2 capacity (H3)

Load Cell 2 Capacity	H3
00050.000kg	





Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Load cell 2 spec. (H4)

Load Cell 2 Spec.	H4
2.00 mv/v	





Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Encoder resolution (H5)

Encoder Resolution	H5
1000 P/rev	





Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Screw pitch (H6)

Screw pitch	H6
5.0mm	



The pitch of ball screws inside the machine

Use  to move point and use  to change value. When finishing, push SET to save file.



Please do not change value without the permission of the supplier

Double pitch (H7)

Double Pitch	H7
100.00mm	



The pitch of extensometer.

Use  to move point and use  to change value.


When finishing, push SET to save file.

Please do not change value without the permission of the supplier

Motor (H8)

Motor	H8
Step Motor	





Use  to select motor. When finishing, push SET to save file.

Please do not change value without the permission of the supplier.

Gear Ratio (H9)

Gear Ratio	H9
5.00	




Use  to move bottom line and use  to change value. When finishing, push SET to save file.

Gear ratio is the value of motor rpm versus ball screws rpm. Please do not change value without the permission of the supplier

Language (HA)

Language	HA
Chinese	



Use  to select language. When finishing, push SET to save file.

Date (HB)

Dater/Time	HB
2006/07/19 02:20:16	



Use to move point and use to change value.

When finishing, push SET to save file.

Motor Resolution(HC)

Motor Resolution	HC
00001000	



Use to move point and use to set motor resolution.

When finishing, push SET to save file.

Please do not change value without the permission of the supplier

Stepping motor: 1000

Servo motor:2500

Max. Speed (HD)

Max	Speed	HD
0000600RPM		



Use to move point and use to set max. speed. When

finishing, push SET to save file.

Please do not change value without the permission of the supplier

Stepping motor: 600rpm

Servo motor: 1. (400W): 3000RPM/

2. (2000W above): 2000RPM

PC connecting


□ Attention: if user wants to leave set up mode, push START to return.

4.3.5 Calibration

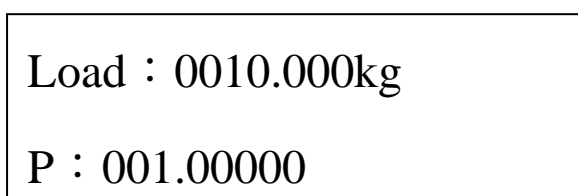
※Attention: Calibration will affect test accuracy so please operate this procedure by specialist.
Push DEL 3sec when at stand-by mode to get into calibration setting mode..



Load cell selection (C1)



Use  to switch. When finishing, push SET to save file.

Load parameter (C2)



Use  to move bottom line and use  to change value. When finishing, push SET to save file.

4.3.6 Error message

When monitor has unusual setting or data is over range, monitor will display wrong message. User has to re-set up or eliminates the wrong message. We will introduce the reason of wrong message and solution below.



Wrong doesn't mean machine will take off problem automation. It's user's responsibility to set up correct parameter.



Wrong message means machine is under abnormal situation.




Wrong message may make software deranged and user has to avoid wrong message happened.





Wrong message may mean machine damaged.

Reason & solution Contents	Possible reason	solution
Overload	Force overload	Push stop to leave. If it's not over max capacity, raise set up value of S2.

Over travel	Over stroke	Push stop to leave. If it's over max travel, raise set up value of S3.
The memory is full	The memory is full	Push stop to leave. Than push data into result and push DEL 3 seconds to delete data.
Data	Data	At least one of test result has to set up display.

 Overload may make load cell damaged can't repair.

 Over travel may make testing machine damaged can't repair.

 Data delete once can't restore.

Chapter 5 First time testing

We will introduce a variety of tensile testing parameters and explain the testing result for the different parameters in the following chapter.

Attention: Since testing materials are various, the test methods and results will be different. User has to set up the test methods in accordance with their specific material and applicable standards. However, operator experience should be considered as well when creating test methods.. The accuracy of the test results will rely heavily on the test method and also be influenced by operator experience.

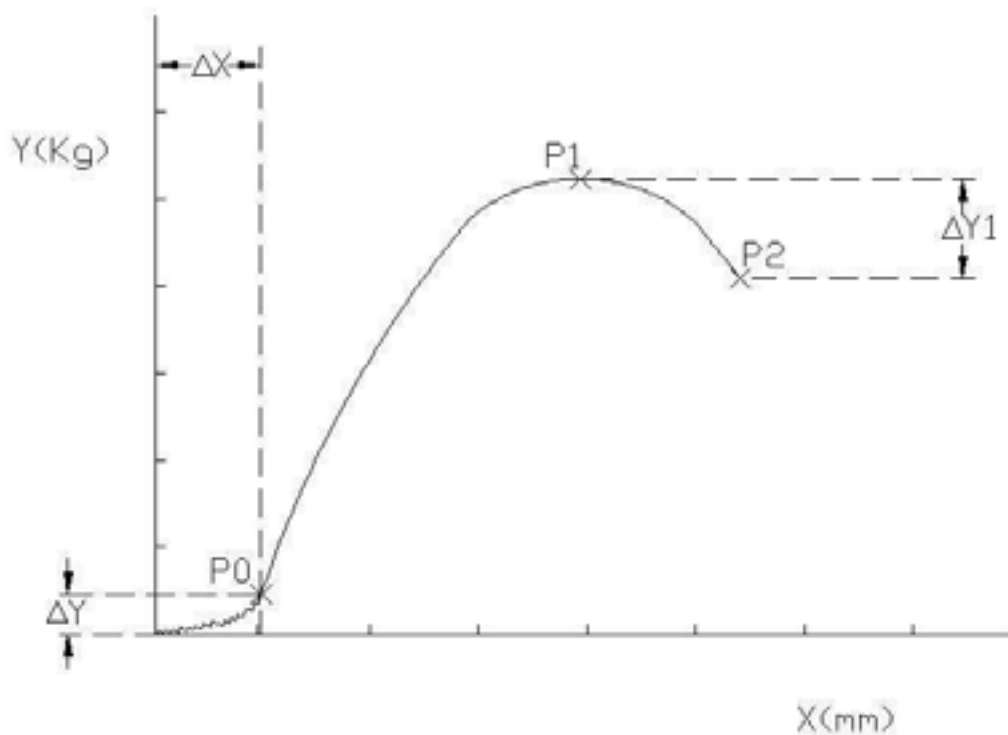


Figure 5.1

5.1 Curves

. The indicated values in the diagram above are explained below:

△ Y : Pre load (Sss T8)

To avoid noise (specimen/electric current/etc) from effecting test results, a small pre-load should be applied to the specimen. This load is referred to as. Point T8 of set up procedure for control panel.

△ **X: Pre displacement**

The displacement before reach preload will be definted as pre displacement.

P1 : Peak /Extension

As the elongation of the sample increases the force of the testing machine is decreased until the sample finally breaks. This will display the maximum force as a peak and is commonly used in tensile testing to calculate ultimate tensile strength. In order to get the peak value, we have to display the testing result as per D1/ D2 in the control panel chapter.

P2 : Break/Extension

When the machine has passed the peak force value for the sample it will continue to pull on the sample at lower force until the sample breaks. The data of force and extension is generally referred to as peak /extension. If you need this data, set up the method accordingly as per D5/D6.

△ **Y : Break percentage**

A percentage value is typically used to describe the difference between the peak and failure force. When force and peak reaches our set up percentage, it ends up with sample failure. In order to test smoothly, we have to set up percentage.

5.2 Example of testing method

Please follow below process to test and realize how to operate this machine.



As the testing material varies, the testing method and result will be different. User should obey material character, testing standard, operation experience etc., to set up machine so that machine could operate smooth and has exactly testing result.

- (1) This machine E/B1 type already connects with power and stay at test table. It has 50kg load cell and wire grip.
- (2) The test material is copper wire. The diameter 1mm, area: 0.785mm².
- (3) According to XXX standard XXX testing method, we realize the following information.
 - Specimen length : 150 mm , at least 5 pieces.
 - Test speed : 50 mm/min ◦
 - Grip distance : 100 mm ◦
 - Test result : tensile, extension. At least 5 times test.
- (4) Please prepare 5 specimens per standard
- (5) We start to set up this machine per this testing

5.1 push “SET” key to get into set up mode

- T1: Tensile
- T2: 59mm/min (speed)
- T3: up (cross bar move up)
- T4: 100mm (the distance between grips)
- T5: 785mm²(specimen area)
- T6: kg (force unit)
- T7: is mm (length unit)
- T8: 0.05(pre load)
- T9: Yes (return function)

5.2 Push SET and Stop key to get into stop machine mode

- S1:50%
- S2: 40kg (to protect load cell)
- S3: 200mm (to protect travel)

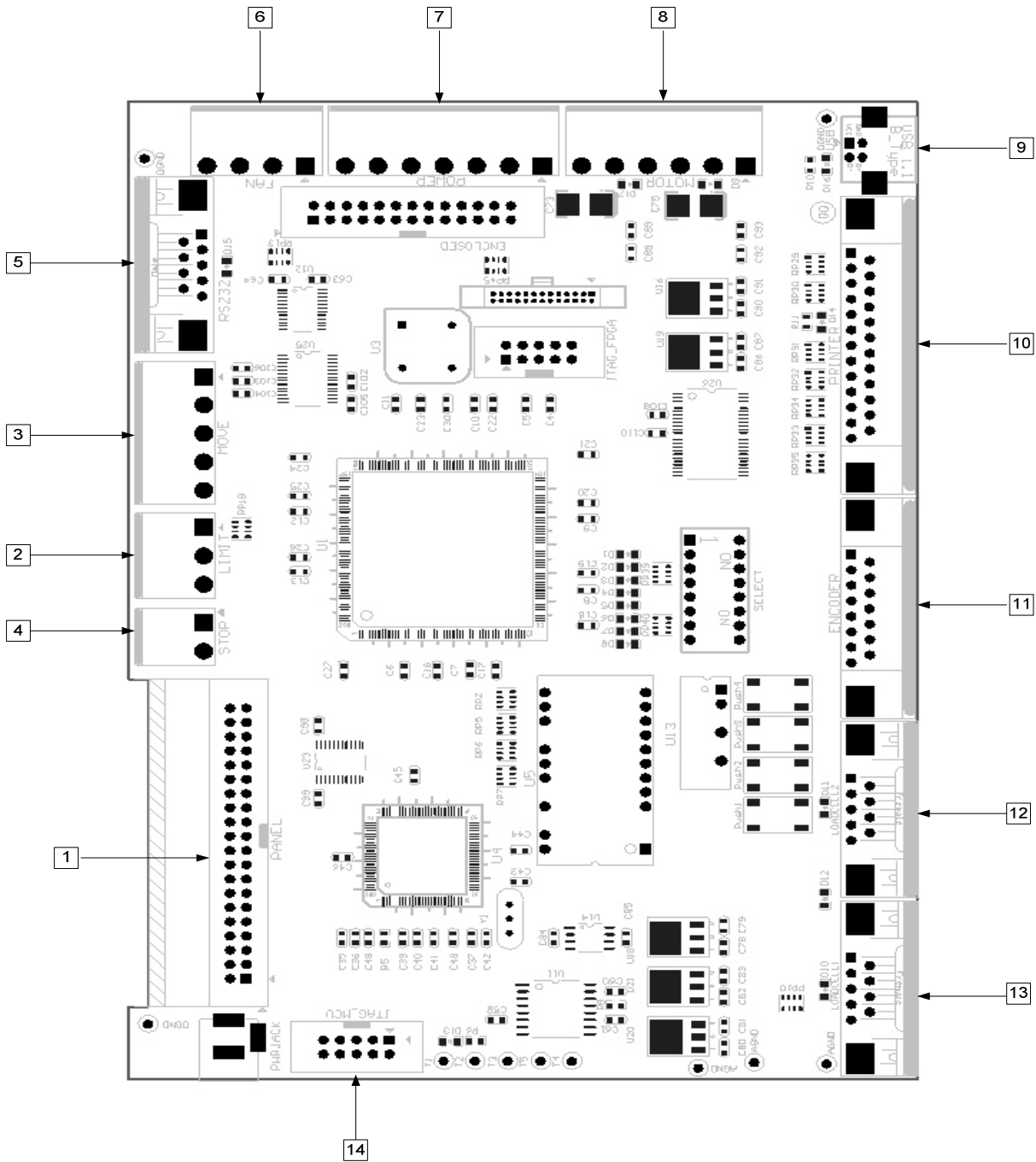
5.3 push SET and DATA to get into display data mode

- D1: Yes (means peak)
- D2: Yes (means peak extension)

- (6)Control crosshead by manual operation to keep the distance is 100mm between two grips.
- (7) Clamp the specimen on the grip
- (8) Push start key to starting testing.
- (9) When testing finish, machine back to start position. We repeat the proceed steep 7to 9 eight till all specimen finish testing.
- (10) Push print key to print all of testing result

Chapter 6 Circuit system

The circuit board provides the function of electric and control sign transmission. Machine can't work if the circuit system malfunction..



Main circuit board

number	type	function
1	40Pin IDE line	Connect to control board
2	3Pin connecter	Connect to machine up/down limit (Normal Open)
3	5Pin connecter	Connect to machine move up/down/emergency (Normal Open)
4	2Pin connecter	Connect to emergency (motor control) , this wire can't thin
5	9Pin D connecter	Connect ser motor control (RS232 / RS485type)
6	4Pin connecter	System and motor thermolysis fan (12Vdc)
7	7Pin connecter	Power supplier (48V &12V)
8	6Pin connecter	IMS motor (have to change parameter MSEL = 7)
9	USB B connecter	USB B type connecter (USB A↔B connecter)
10	25Pin D connecter	Standard 25Pin IEEE-1284 printer
11	15Pin D connecter	Two set input encoder(5Vdc power supplied)
12	9Pin D connecter	The second LoadCell connecter (use KeyPro transfer board)
13	9Pin D connecter	The first load cell connecter (use KeyPro transfer board)
14	10Pin IDE line	Firmware Burner/inspect mistakes connecter.

Limit switch 3Pin connector

number	function
5	Up limit(Normal Open)
4	Down limit(Normal Open)
3	Up and down connect point

Up/down limit/emergency stop 5Pin connector

number	function
10	Up move (Normal Open)
9	Down move (Normal Open)
8	Common connect (Pin 3 &Pin 5 communicate)
7	emergency (Normal Open)
6	Common connect (Pin 3 &Pin 5 communicate)

Motor emergency stop switch 2Pin connector

number	function
2 (square welded point)	Step motor power switch(Normal Close). Do not use over thin wire.
1	Step motor power switch(Normal Close).Do not use over thin wire.

Motor/mother board power input 7Pin connector

number	function
--------	----------

21	Power supplier +48Vdc
20	Power supplier GND
19	empty
18	empty
17	Power supplier +12Vdc
16	Power supplier GND
15	System connected

Remark : POWER connector's 7Pin connect with power supplier's 3Pin. Have to connect AC power's 3pin at the same time.

Stepping motor/ Cabinet Radiator fan 4Pin connecter

number	function
14	Step motor radiator fan (+12Vdc)
13	Step motor radiator fan (GND)
12	System cabinet radiator fan (+12Vdc)
11	System cabinet radiator fan (GND)

Stepping motor 6Pin connecter

number	color	function
27	Red	IMS step motor power V+
26	Black	IMS step motor power GND
25	Brown	IMS step motor control sign EN
24	blue	IMS step motor control sign DIR
23	orange	IMS step motor control sign SCK
22	white	IMS step motor control power OPTO SPLY

6.1 Circuit repair

The circuit system repaired parts have to use our company standard specification. If use other Company parts cause machine damaged, we regret can't response for it.

The circuit system is our company designed and please don't change directly. If change circuit Design cause machine damaged, we regret can't response for it.



Circuit system includes high voltage/high circuit factor so it has danger.

If machine has following situation, it may cause by circuit invalid.

1. when machine turn to "on" and power light is not work.
2. Circuit system has short circuit or broken circuit situation.
3. Circuit system's component has burned or invalid situation.

The steps change circuit system as following:

1. Tool : please prepare odometer 、 torch 、 optic strippers, etc.
2. Please close computer system and machine power and take off plug. This proceed is very important, if you don't shut down power completed will induce current.
3. Please refer operation's circuit routing drawing checking and repair.

Chapter 7 Maintenance and troubleshooting

7.1 Maintenance

1. Please keep this machine clean and sweep with dry cloth often.



forbid using an organic solvent to sweep this machine

- 2 Although the metal parts do anti-rust process, please kindly use little oil to sweep machine constantly.
3. Most of the clump is made by metal. So hand sweat will also corrode metal part. Please sweep the grip constantly.
4. The computer system use for machine should avoid dusty or oil.

7.2 The maintain of long usage

1. Anti-rust process: please use anti-rust on all of metal parts to ensure metal parts use longer.
2. Dust process: please use dust cover on this machine.
3. Grip: please take off grip from machine when they don't use.
4. Circuit: please take off power plug when machine doesn't work.
5. Computer: please take off power when machine doesn't work.

7.3 Troubleshooting

Question	Reason	Solution	Note
1) Load won't display	1 Loadcell wire do not connect well	1.1 Please checking the wiring	
	2 Loadcell parameter disorder	2.1 Please check the default value.(Hardware→Calibration→loadcell→enter password) Or email this picture to us service department.	mrc@mrclab.com
	3 Choose wrong loadcell	3.1 Please check the loadcell 1 and loadcell 2 capacity and the connecting port is correct 3.2 Please check the loadcell setting of control panel and software	
	4 Loadcell break	4.1 Turn on machine and check the first load display. If the load bigger than loadcell capacity. This means loadcell broke, users need to replace a new one.	
	5 Connection isn't successful	5.1 Please check the control button of software is grey or not.	
	6 Loadcell connects to wrong port	6.1 Please move the loadcell to correct port.	
2) Wrong load display	1 Loadcell calibration parameter is wrong	1.1 Please check if the loadcell parameter is the same as default value. If not, users need to adjust the parameter	If user changes new loadcell, please record the new parameter. Don't use the old value.
	2 Choose wrong loadcell	2.1 Please check the loadcell 1 and loadcell 2 capacity and the connecting port is correct	
	3 Loadcell can't reach full capacity or can't be calibrated	3.1 Please check the loadcell capacity and grip weight. If grip weight heavier 1/10 than the	Please contact us if problems can not be solved

Question	Reason	Solution	Note
		loadcell capacity. Please make grip lighter or change high capacity loadcell.	
3) Machine can not connect with computer	1 USB line does not connect well	1.1 Connect well the USB line	
	2 The driver of USB line has not installed	2.1 Please make sure to install the driver and install the software again.	
	3 User does not push PC button	3.1 Please check the PC light is on or not. If not, please push PC button.	
	4 Software and hardware version is incorrect or different.	4.1 Please check the hardware version	Please ask our service department for help.
	5 Circuit board disorder	5.1 Please check all the wiring connects well.	
	6 user does not use the wire that we supply	6.1 Circuit board will damage. Please contact service department for help.	This event is not in the warranty range.
	7 Computer system is not like as requested	7.1 Please change another computer.	
4) Crosshead movement has problem	1 Push emergency button	1.1 Release emergency button.	
	2 Touch up or down limit	2.1 Move the crosshead up or down.	
	3 wrong power supply	3.1 Please make sure the power supply is correct.	Power supply will be marked on name plate.
	4 Manual buttons can not control crosshead movement.	4.1 Check if manual button contact is completed. Need to repair wiring and replace a new button	Please contact us
	5 Machine can only do single direction movement	5.1 Please check the location of up or down limit.	
	6 Machine does not have	6.1 Please check the controller of	

Question	Reason	Solution	Note
	action	driven motor and tell us the signal code. 6.2 Please be sure to use the correct power supply.	
5 Machine displays wrong load when operating without testing specimen.	1loadcell wire does not connect well	1.1Loadcell should be installed well on machine	
	2 Circuit board damage	2.1change new circuit board	
	3 load cell breakdown	3.1 Check If loadcell damage or is interfered.	
6can not print out data	1Printer does not install driven program	1.1 Install driven program.	
7Machine stop at midway	1machine stop at the beginning of the test	1.1Preload value is too small. (Test)→(Method)→(Enlarge the preload value)	
		1.2 “Percent of peak” is too high	
	2machine stop while reaching certain force or displacement	2.1Please check if machine exceeds the overload or overdisplcemnet protection.	
	3.Crosshead touch up and down limit	3.1 Please adjust the position of up and down limit.	
8 Machine can not be operated without connecting with computer	1save data is full	1.1Please check DATAR to see if file amount reach 50. If yes, please push DEL for 3 seconds to delete all files and the machine will work again.	
	2Please release the protection function or machine won't work.	2.1Please release the protection function.	
	3Loadcell signal has problem	3.1Loadcell is broken or wiring has problem	
9password	1 Preset password is qctech	1.1Enter new password 1.2 Install software again. Please remember to save the	

Question	Reason	Solution	Note
		previous test data.	
10 Machine can not work after changing new loadcell	1. Use the components which are not provided by Comotech	Please contact us	
11 Machine displacement differ from software displacement	1 Displacement displays on software doubles comparing to actual displacement	1.1 Please check the hardware setting such as screw pitch, gear ratio, encoder signal...etc.	
	2 Displacement displays on software differs a little from actual displacement	2.1 Please make sure you want to know the peak value or break value.	
12 Data saving takes a long time or machine disconnect with computer frequently	1 Testing file is too big	The total test data do not exceed 50 pieces.	

Appendix: Default setting value

Item	Value	Item	Value	Item	Value	Item	Value
T1 Test Type		D1 Peak Load (PL)		S1 Percent Mode		H1 Load Cell 1 Capacity	
T2 Test Speed		D2 Peak Extension (PE)		S2 Max Load		H2 Load Cell 1 Spec.	
T3 Test Direction		D3 Peak Strength (PS)		S3 Max Extension		H3 Load Cell 2 Capacity	
T4 Gauge Length		D4 Peak Elongation (P %)		S4 Max Elongation		H4 Load Cell 2 Spec.	
T5 Area		D5 Break Load (BL)		C1 Load Cell Selection		H5 Encoder Resolution	
T6 Load Unit		D6 Break Extension (BE)		C2 Load: P:		H6 Screw Pitch	
T7 Length Unit		D7 Break Strength (BS)				H7 Double Pitch	
T8 Pre load		D8 Break Elongation (B %)				H8 Motor	
T9 Auto Return						H9 Gear Ratio	
TA Load Cell						HA Language	
TB Extensometer						HB Dater/Time	
TC Save The Data						HC Motor Resolution	
						HD Max Speed	
						HE Auto Line Mode	